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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,359	12/08/2003	Chao-Chueh Wu	11491-US-PA	1358
31561	7590	06/15/2005	EXAMINER	
JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE 7 FLOOR-1, NO. 100 ROOSEVELT ROAD, SECTION 2 TAIPEI, 100 TAIWAN			LE, THAO P	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/707,359	Applicant(s) WU, CHAO-CHUEH	
	Examiner Thao P. Le	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 6/1/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 and 28-33 is/are rejected.
- 7) ☒ Claim(s) 23-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/08/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner. .
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Examiner took notice of remarks made on 06/01/05. The declaration under 35 U.S.C 1.131 was received on 6/1/05, and the previous rejection has been withdrawn.

Claims 1-33 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-6, 8-9 are rejected under 35 USC 102 (b) as being anticipated by Chan et al., U.S. Patent No. 6,252,277.

Regarding claim 1, Chan et al. discloses a method of doping sidewalls of an isolation trench (See Figs. 3-7, and Cols. 1-12), comprising: providing a substrate having a plurality of trenches thereon (fig. 3), forming a blocking layer in each trenches such that the top surface of the blocking layer 37 is lower than the top surface of the substrate (fig. 4f), performing a sidewall doping process 36 to form a doped region in the substrate at the upper trench sidewall (fig. 4f; lines 22-40, Col. 5), and removing the blocking layers within the trenches (fig. 4g).

Regarding claim 2, Chan et al. discloses the dopants in the sidewall doping are complementary to the ones for forming source/drain regions in adjacent to the trenches.

Regarding claim 3, Chan et al. discloses the sidewall doping process comprises an ion implantation (lines 22-40, Col. 5).

Regarding claim 5, Chan et al. discloses the depth of the doped region in the sidewall doping process is shallower than the junction depth of source/drain region (see Figs. 4s).

Regarding claim 6, Chan et al. discloses wherein the step of forming the blocking layer comprises: forming a blocking layer over the substrate to fill trenches, etching the blocking layer and portions of the blocking layer remains within the trenches (Cols. 4-5; figs. 4A-4G).

Regarding claim 8, Chan et al. discloses the use of chemical vapor deposition to form the blocking layer (lines 39-43, Col. 4).

Regarding claim 9, Chan et al. discloses the etching process comprises wet etching operation (lines 18-22, Col. 5).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 7, 10-22, 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Chan et al., U.S. Patent No. 6,252,277.

Regarding claim 4, Chan et al. discloses the ion implantation of sidewall is carried out using an energy level an dosage and angle within the range cited in claim 4 (lines 35-38, Col. 5).

Regarding claim 7, Chan et al. discloses the blocking layer is silicon oxide. It is obvious that silicon oxide can be used as photoresist material.

Regarding claims 10, 21, 22, Chan et al. discloses a method of doping sidewalls of an isolation trench (See Figs. 3-7, and Cols. 1-12), comprising: providing a substrate having a plurality of trenches thereon (fig. 3), forming a blocking layer in each trenches such that the top surface of the blocking layer 37 is lower than the top surface of the substrate (fig. 4f), performing a sidewall doping process 36 to from a doped region in the substrate at the upper trench sidewall (fig. 4f; lines 22-40, Col. 5), and removing the

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blocking layers within the trenches (fig. 4g). Chan et al. doesn't disclose the substrate having first region and second region, however, Chan et al. discloses the method of forming MOSFET. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form first region and second region (PMOS and NMOS) in the MOSFET, and a mask is formed to cover the second region while performing etching process in the first region.

Regarding claims 11-12, it would have been obvious to one having ordinary skill in the art to form the mask layer before or after etching process, the order of steps would not impact or make any different in product's functions, manners, and characteristics.

Regarding claims 13, 28, Chan et al. discloses the etching process comprises wet etching operation (lines 18-22, Col. 5).

Regarding claim 14, Chan et al. discloses the blocking layer is silicon oxide. It is obvious that silicon oxide can be used as photoresist material, and it is well known in the art that photoresist layer is used as the mask.

Regarding claim 15, Chan et al. discloses the use of chemical vapor deposition to form the blocking layer (lines 39-43, Col. 4).

Regarding claims 16, 29, Chan et al. discloses wherein the dopants in the sidewall doping process for forming the doped region are complementary to the ones for forming a doped source/drain region.

Regarding claims 17, 30, Chan et al. discloses the sidewall doping process comprises an ion implantation (lines 22-40, Col. 5).

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Regarding claims 18, 31, Chan et al. discloses the ion implantation of sidewall is carried out using an energy level an dosage and angle within the range cited in claims 18 and 31 (lines 35-38, Col. 5).

Regarding claims 19, 32, Chan et al. discloses the depth of the doped region in the sidewall doping process is shallower than the junction depth of source/drain region (see Figs. 4s).

Regarding claims 20, 33, Chan et al. discloses the method of forming MOSFET, it is obvious that MOSFET comprising NMOS and PMOS, therefore, it is inherent that different type of MOS devices (N or P MOS) are formed on the first and second region.

Claim Objection

Claim 23 would be allowed.

Dependent Claim 23 and those claims (24-27) which depend on claim 23 are objected and would be allowable if claim 23 is rewritten as independent claim which includes all of the limitations of the base claim and any intervening claims (Dependent claim). Claim 23 is considered allowable since none of prior art teach or suggest the claimed limitations including, among other steps cited in independent claim 21, the step of forming the blocking layer in the first region is thinner than the blocking layer in the second region using nanoimprint process by pressing a mold into the material layer so that thickness of the material layer in the first region is reduced.

If Applicants are aware of better art than that which has been cited, they are required to call such to attention of the examiner.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785. The examiner can normally be reached on M-T (7-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Thao P. Le', with a stylized, cursive script.

Thao P. Le
Examiner
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